CLAIMS

1. A method for installing a refrigeration device that comprises:

a heat source unit (2 - 802, 1002, 1102, 1502 - 1802, 2002, 2102, 2502 - 2802, 3002, 3102) having a compressor (21) and a heat-source-side heat exchanger (23);

a utilization unit (5, 3005) having a utilization-side heat exchanger 51; and a refrigerant connection pipe (6, 3006, 7, 3007) for connecting said heat source unit and said utilization unit, comprising;

a refrigerant circuit formation step for forming a refrigerant circuit (10, 3010, 3110) by connecting said heat source unit and said utilization unit via said refrigerant connection pipe; and

a non-condensable gas discharge step for operating said compressor, recirculating the refrigerant in said refrigerant circuit, cooling and separating at least a portion of the refrigerant that flows between said heat-source-side heat exchanger and said utilization-side heat exchanger into a liquid refrigerant and a gas refrigerant that includes the non-condensable gas remaining in said refrigerant connection pipe, separating said non-condensable gas using a separation membrane (34b, 1034b, 2063b, 2064b) from said gas refrigerant obtained by gas-liquid separation, and discharging the non-condensable gas to the outside of said refrigerant circuit.

2. The method for installing a refrigeration device as recited in Claim 1, wherein

in said non-condensable gas discharge step, the refrigerant that flows between said heat-source-side heat exchanger (23) and said utilization-side heat exchanger (51) is separated into a liquid refrigerant and a gas refrigerant that includes said non-condensable gas, after which said gas refrigerant obtained by gas-liquid separation is cooled.

3. The method for installing a refrigeration device as recited in Claim 1 or Claim 2, further comprising:

an airtightness testing step for testing the airtightness of said refrigerant connection pipe (6, 3006, 7, 3007) prior to said non-condensable gas discharge step; and

an seal gas releasing step for releasing into the atmosphere the seal gas to reduce the pressure thereof inside said refrigerant connection pipe after said airtightness testing step.

4. A refrigeration device (1 - 801, 1001, 1101, 1501 - 1801, 2001, 2101, 2501 - 2801, 3001, 3101) comprising a refrigerant circuit (10, 3010, 3110) in which a utilization unit (5, 3005)

having a utilization-side heat exchanger (51), and a heat source unit (2 - 802, 1002, 1102, 1502 - 1802, 2002, 2102, 2502 - 2802, 3002, 3102) having a compressor (21) and a heat-source-side heat exchanger (23) are connected via a refrigerant connection pipe (6, 3006, 7, 3007), said refrigeration device further comprising:

a cooler (32, 332, 832) that is connected to a liquid-side refrigerant circuit (11, 3011, 3111) for connecting said heat-source-side heat exchanger to said utilization-side heat exchanger, and that cools at least a portion of the refrigerant that flows between said heat-source-side heat exchanger and said utilization-side heat exchanger as said compressor is operated and the refrigerant is recirculated in said refrigerant circuit;

a gas-liquid separator (33) for separating the refrigerant cooled by said cooler, into a liquid refrigerant and a gas refrigerant that includes the non-condensable gas remaining in said refrigerant connection pipe; and

a separation membrane device (34, 1034, 2034, 2134) having a separation membrane (34b, 1034b, 2063b, 2064b) for separating said non-condensable gas from the gas refrigerant obtained by gas-liquid separation using said gas-liquid separator, for discharging to the outside of the refrigerant circuit said non-condensable gas separated by said separation membrane.

5. The refrigeration device (1 - 701, 1001, 1101, 1501 - 1801, 2001, 2101, 2501 - 2801, 3001, 3101) as recited in Claim 4, wherein

said liquid-side refrigerant circuit (11, 3011, 3111) further has a receiver (25) capable of collecting the refrigerant that flows between said heat-source-side heat exchanger and said utilization-side heat exchanger; and

said cooler (32, 332) cools the gas refrigerant including said non-condensable gas that is separated into gas and liquid inside said receiver.

6. The refrigeration device (1 - 801, 1001, 1101, 1501 - 1801, 2001, 2101, 2501 - 2801, 3001, 3101) as recited in Claim 4 or Claim 5, wherein

said cooler (32, 332) is a heat exchanger that uses as a cooling source the refrigerant that flows through said refrigerant circuit.

7. The refrigeration device (1 - 201, 401, 501, 701, 1001, 1101, 1501 - 1801, 2001, 2101, 2501 - 2801, 3001, 3101) as recited in any one claim of Claim 4 through Claim 6, wherein

said cooler (32) is a coiled heat transfer tube disposed inside said gas-liquid separator (33).

8. The refrigeration device (1 - 301, 501 - 801, 1001, 1101, 1501 - 1801, 2001, 2101, 2501 - 2801, 3001, 3101) as recited in any one claim of Claim 4 through Claim 7, wherein

said gas-liquid separator (33) is connected so that the liquid refrigerant that is separated into gas and liquid in said gas-liquid separator is returned to said receiver (25).

9. The refrigeration device (701, 801) as recited in Claim 8, wherein

said gas-liquid separator (33) is integrally formed with said receiver (25).

10. The refrigeration device (501, 601, 701) as recited in any one claim of Claim 4 through Claim 9, wherein

said separation membrane device (34) is integrally formed with said gas-liquid separator (33).